# 5.4 Transportation/Circulation

## 5.4.1 Introduction

The analysis investigates existing operations in the vicinity of the proposed interchange, as well as operations in the vicinity of the proposed interchange for cumulative conditions, which for this study is assumed to be the year 2025. The analysis also investigates the traffic operations and impacts associated with the proposed interchange for both existing and cumulative conditions.

A traffic study was developed as part of the technical studies prepared for this EIR. Detailed methodology and assumptions used for this chapter are incorporated by reference from the technical study. The technical study can be reviewed during normal business hours at Caltrans' District 3 Office located at 2800 Gateway Oaks, Sacramento, CA.

## 5.4.2 Environmental Setting

### *Existing Setting*

#### *Roads*

The following roadways are located in the vicinity of the proposed interchange:

**US-50** is an east-west freeway, which provides regional access between Sacramento and Placerville, and recreational areas within the southern Lake Tahoe area. In the vicinity of the proposed interchange, US-50 has two lanes in each direction, 10 ft. (3.0 m) paved outside shoulders and 5 ft. (1.5 m) paved inside shoulders, and a 70 ft. (21.3 m) wide grassy median. At present, approximately 45,500 average daily trips occur along US-50 in the vicinity of the proposed interchange.

**East Shingle Springs Drive** is a 2-lane rural roadway, which runs in a north-south direction immediately west of the proposed interchange. The roadway begins within the gated residential community immediately north of US-50 and Rock Barn Road, and continues south of US-50 approximately 1 mile (1.5 km) to Buckeye Road, where the roadway terminates. At present, the average daily traffic along the roadway is less than 1,000 vehicles per day. E. Shingle Springs Drive is maintained by the County of El Dorado up to the private gate immediately north of US-50 and Rock Barn Road.

**Greenstone Road** is a 2-lane rural roadway which runs in a north-south direction immediately east of the proposed interchange. The roadway begins approximately 1 mile

north of US-50 at Green Valley Road, and continues south of US-50 a few miles to Mother Lode Drive. At present, the average daily traffic along the roadway is approximately 2,000 vehicles per day north of US-50, and less than 1,000 vehicles per day south of US-50. There are no sidewalks and minimal or non-existent shoulders along the roadway, and the roadway width is approximately 24 feet (7.2 m). Greenstone Road is maintained by the County of El Dorado.

**Grassy Run Road**, **Rolling Rock Road**, and **Reservation Road** comprise the route which is currently used to access the Shingle Springs Rancheria. The construction of the new interchange will result in the rerouting of a significant percentage of Rancheria traffic currently using these roadways to the new interchange. To access the Rancheria today, traffic turns left from Greenstone Road to Grassy Run Road. A few hundred feet west of Greenstone Road, Grassy Run Road transitions from a County road to a private residential roadway. Rancheria bound traffic continues along the private roads of Rolling Rock Road and Reservation Road. A count of traffic along the route currently used to access the site was conducted early 1999, and showed that during the PM peak hour approximately 15 inbound vehicles and 7 outbound vehicles were traveling to and from the Rancheria (and adjacent private development). All three of these roads are narrow 2-lane roadways with no sidewalk or shoulder, and contain extreme horizontal and vertical curvature.

### *Existing Traffic Volumes*

#### *Peak Hour Volumes*

Existing weekday AM and PM peak hour and Saturday peak hour counts along US-50 were established using the following resources:

1) Raw 1999 Caltrans Traffic counts from their count station on US-50 between the Cameron Park Drive and Ponderosa Road interchanges (Caltrans does not maintain a count station in the immediate vicinity of the proposed interchange).

2) *Caltrans' 1998 Traffic Volumes on California State Highways* (including "Peak Hour Volume Data by Direction".

3) Peak hour ramp counts at the US-50/East Shingle Springs Drive interchange.

4) 7-day/24-hour roadway tube counts along East Shingle Springs Drive south of US-50.

**Table 5.4-1** provides a summary of existing freeway volumes along US-50 for all three peak hour scenarios.

**Table 5.4-1 Existing No Project Peak Hour Volumes**

| Freeway Segment | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
|---|---|---|---|
| Eastbound US-50 (between E. Shingle Springs & Greenstone) | 1,229 | 2,407 | 1,872 |
| Westbound US-50 (between Greenstone & E. Shingle Springs) | 2,206 | 1,589 | 1,691 |
| **TOTAL** | **3,435** | **3,996** | **3,563** |

*Source:* David Evans and Associates, 2001.

### *Daily Volumes*

Existing daily volumes as reported for the local roads analysis is based on traffic counts as reported within El Dorado County Department of Transportation's "*2000 Traffic Count Annual Summary*." These counts were supplemented as necessary from additional traffic counts supplied by the El Dorado County Department of Transportation, the 1994 Regional Transportation Plan for El Dorado County. All older counts which were used were increased to reflect 2000 counts.

Volumes along Caltrans facilities were obtained from "*2000 Caltrans Traffic Volume on California State Highways*" data as included on Caltrans' web site.

### *Level of Service Concept*

The operating conditions experienced by motorists are described as "levels of service" (LOS). Level of service is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Levels of service "A" through "E" generally represent traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions.

### *Existing Freeway Mainline Operations*

Traffic operations were evaluated for existing weekday AM peak hour, PM peak hour, and Saturday peak hour conditions.

**Table 5.4-2** shows the current freeway mainline operations for all three peak hour scenarios.

**Table 5.4-2 Existing No Project Freeway Mainline Level of Service**

| Freeway Segment | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
|---|---|---|---|
| Eastbound US-50 (between E. Shingle Springs & Greenstone) | B | D | C |
| Westbound US-50 (between Greenstone & E. Shingle Springs) | D | C | C |

*Source:* David Evans and Associates, 2001.
*Notes:* (1) Free Flow speed varies - "Ideal" Free Flow Speed of 65 mph adjusted to account for specific highway geometry.
(2) The *Route 50 Transportation Concept Report* states that the concept level of service for US-50 between Sacramento and Placerville is LOS E.

As the above table shows, the freeway currently operates acceptably at LOS D along the eastbound direction during the PM peak hour, and along the westbound direction during the AM peak hour. During the Saturday peak hour, and along the opposing non-peak direction of travel during weekday AM and PM peak hours, the freeway operates acceptably at LOS C or better.

### *Accident Analysis*

To establish potential safety issues and accident potential along US-50 in the vicinity of the new interchange, an analysis of accidents over the past 4 years was conducted along US-50 between the East Shingle Springs Drive and Greenstone Road interchanges, which are located approximately 1 mile (1.5 km) west and east of the proposed interchange, respectively.

**Table 5.4-3** provides an annual and 4-year summary of accidents occurring along US-50 between East Shingle Springs Drive and Greenstone Road. The table shows a total of 27 accidents occurred along this freeway segment during the 4 year period between January 1, 1997 and December 31, 2000. The table also shows that no particular type of accident, or roadway conditions or factors contributing to accidents, are significantly higher than any of the other accident types, or contributing roadway conditions or factors.

The section of US-50 in the vicinity of the proposed interchange does not experience a high number of any particular type of accidents, a high number of accidents due to any particular roadway condition, or a higher rate of accidents than that which occurs along similar types of facilities.

**Table 5.4-3 Accident Rate**

| | |
|---|---|
| Total Accidents (4 years)[(1)] | 27 accidents |
| Total Fatalities (4 years) | 0 fatalities |
| Distance (E Shingle Springs to Greenstone) | 1.89 miles |
| Daily Average Daily Traffic Volume[(1)] | Year 1997 to 1999: 43,300 veh/day<br>Year 2000: 43,000 veh/day |
| 4 Year Volume | 63.1085 million-vehicles |
| **Actual Accident Rate** | **0.23 accidents/million-vehicle-miles** |
| **Average Accident Rate for Similar Facility[(1)]** | **0.60 accidents/million-vehicle-miles** |

*Source:* David Evans and Associates, 2001.
*Notes:* (1) Caltrans accident summary printout.

## *Cumulative (2025) Setting*

### *Cumulative Roadway Network*

The roadway network in the immediate vicinity of the project site is assumed to remain the same for Cumulative Conditions as that which currently exists for Existing Conditions. Caltrans currently has no programmed improvement for US-50 for Cumulative Conditions, although there are currently discussions to either provide an HOV lane along the freeway, and/or 6 standard lanes along the freeway. Within this analysis, it is assumed that US-50 will remain a 4-lane facility.

The cumulative roadway network analyzed for the local roads analysis was established in coordination with El Dorado County traffic engineering personnel. Local roadways which were analyzed were those identified as "major roadways," which are defined as those roadways identified on both the *"El Dorado County General Plan Circulation Map,"* and within the roadway network contained within the 1999 version of the "*El Dorado County Travel Demand Forecasting Model"* in MINUTP. Cumulative year roadway geometrics are based on the roadway network geometries included within the 2022 CIP (Capitol Improvement Program) data network files contained with the 1999 El Dorado County travel demand model.

## *Cumulative Background Volumes*

Detailed methodology and assumptions used to establish cumulative background volumes were established in the detailed traffic study developed for the EIR technical studies. The methodology and assumptions used to establish cumulative background volumes are incorporated by reference from the technical study. The technical study can be reviewed during normal business hours at Caltrans' District 3 Office located at 2800 Gateway Oaks, Sacramento, CA.

### *Peak Hour Volumes*

**Table 5.4-4** provides a summary of cumulative (2025) freeway volumes along US-50 for all three peak hour scenarios.

**Table 5.4-4 Cumulative No Project Peak Hour Volumes**

| Freeway Segment | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
|---|---|---|---|
| Eastbound US-50 (between E. Shingle Springs & Greenstone) | 2,150 | 3,441 | 2,681 |
| Westbound US-50 (between Greenstone & E. Shingle Springs) | 3,086 | 2,316 | 2,465 |
| **TOTAL** | **5,236** | **5,757** | **5,146** |

*Source:* David Evans and Associates, 2001.

### *Cumulative Freeway Mainline Operations*

**Table 5.4-5** shows the freeway mainline operations that are projected for all three peak hour scenarios for a 4-lane facility.

**Table 5.4-5 Cumulative No Project (4-lanes) Freeway Mainline Level of Service**

| Freeway Segment | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
|---|---|---|---|
| Eastbound US-50 (between E. Shingle Springs & Greenstone) | D | E | E |
| Westbound US-50 (between Greenstone & E. Shingle Springs) | E | D | D |

*Source:* David Evans and Associates, 2001.
*Notes*: (1) Free Flow speed varies - "Ideal" Free Flow Speed of 65 mph adjusted to account for specific highway geometry.
(2) The *Route 50 Transportation Concept Report* states that the concept level of service for US-50 between Sacramento and Placerville is LOS E.

As the above table shows, if US-50 remains a 4-lane facility without any auxiliary lanes, the freeway is projected to operate acceptably at LOS E along the eastbound direction during the weekday PM peak hour and Saturday peak hour, and along the westbound direction during the AM peak hour. The levels of service along the opposing direction during all three peak hours are also projected to operate acceptably at LOS D.

## 5.4.3 Impacts And Mitigation Measures

### *CEQA Significance Criteria*

The target level of service for this analysis is based primarily on *Caltrans' State Route 50 Transportation Concept Report*, issued in April, 1998, which states that the concept level of service for US-50 between Sacramento and Placerville is LOS E. LOS below this level (LOS "F") would be considered an unacceptable condition for CEQA purposes. There are generally accepted numeric (or alpha (A - F)) significance criteria for CEQA purposes but not for NEPA purposes.

### *Freeway Mainline and Freeway Ramps*

At the direction of Caltrans staff, the concept level of service for freeway mainline and freeway ramp merge analysis is LOS E, thus LOS "F" is considered unacceptable for CEQA purposes on freeway mainline and merge analyses.

The target level of service for freeway ramp diverge analysis is a reduced LOS D, thus LOS "E" or "F" is considered unacceptable for CEQA purposes on diverge analyses.

### *Study Intersections*

In terms of the new intersections which may be a part of the proposed interchange, the applicable target level of service criteria for the new intersections would likely need to conform to Caltrans level of service standards for CEQA purposes. Using Caltrans concept level of service criteria as described above, LOS D would logically be used as the CEQA target level of service for new intersections.

However, intersection levels of service should also be checked against the target level of service criteria established for El Dorado County. The 1996 El Dorado County General Plan states the following in Policy 3.5.1.1:

> *The County shall adopt a roadway plan consistent with planned land use and shall maintain an operating Level of Service of 'E' or better on all roadways, consistent with Objective 3.5.1. In addition, all road segments projected in the roadway plan at the year 2015 to be operating at LOS A, B, or C shall not be allowed to fall below LOS C and all road segments at LOS D shall not fall below LOS D.*

Therefore, LOS "C" is regarded as the target LOS for the newly created intersections. LOS below this level (LOS "D", "E" or "F") is considered an unacceptable condition for the CEQA component of this analysis.

## Methodology

The traffic operations analysis included within this study evaluates the following:

- Freeway Mainline Operations
- Freeway Ramp Merge/Diverge Operations
- Freeway Auxiliary Lane/Weaving Analysis
- Interchange Intersection Operations
- Interchange Queuing
- Freeway Ramp Metering
- Local Roads
- Accidents

Detailed methodologies for the above traffic operations were established as part of the detailed traffic study prepared for this EIR. The detailed methodologies are hereby incorporated by reference from the technical study, which can be reviewed during normal business hours at Caltrans' District 3 Office located at 2800 Gateway Oaks, Sacramento, CA.

### Analysis Scenarios

Traffic operations associated with the proposed interchange are analyzed for the following three peak hour scenarios, as established through coordination with Caltrans:

- Weekday AM Peak Hour
- Weekday PM Peak Hour
- Saturday Peak Hour

Traffic operations are also analyzed for both of the following scenarios:

- Existing Conditions
- Cumulative (Year 2025) Conditions

For the local roads analysis, impacts are analyzed for daily conditions.

## Baseline Rancheria Traffic

### Existing Baseline Rancheria Traffic

The provision of a new freeway interchange which will provide access to the existing Rancheria will result in a slight adjustment of traffic on roadways surrounding the project site. Vehicles currently access the Rancheria site from Greenstone Road via the private roadways of Grassy Run Road, Rolling Rock Road, and Reservation Road. Following the construction of the new interchange, these vehicles would likely shift over to the interchange.

A count of traffic along the route currently used to access the site was conducted early 1999, and showed that during the PM peak hour approximately 15 inbound vehicles and 7 outbound vehicles were traveling to and from the Rancheria (and adjacent private development). These volumes were reassigned to the new interchange and US-50 to create an adjusted baseline weekday PM peak hour scenario. AM peak hour and Saturday peak hour volumes throughout the study area were similarly adjusted to reflect rerouted trips during these peak hour periods. Newly generated trips from the proposed hotel and casino were added to these baseline Rancheria volumes.

### *Cumulative Baseline Rancheria Traffic*

Baseline Rancheria traffic is expected to grow along with background traffic within the rest of the El Dorado County area. For this analysis, an annual growth rate of 1% per year was assumed and added to existing baseline Rancheria peak hour traffic volumes to establish cumulative baseline Rancheria volumes. The 1% annual growth rate was established through consultation with officials of the tribal council who provided information regarding historical growth, and projected growth within the Rancheria. Rather than increase each of the individual turning movements, the inbound/outbound volumes were grown by a compounded growth rate of 1% per year. These were then proportioned out among the intersection turning movements at each of the ramp intersections. Newly generated trips from the proposed hotel and casino project were added to these baseline Rancheria volumes.

### *Casino Traffic Volumes*

This section establishes the trips which would be generated by the proposed hotel and casino development. This is necessary since the casino development will comprise nearly all of the traffic volumes for the interchange. To establish total volumes for the proposed interchange, the hotel and casino volumes established within this section are added to baseline Rancheria traffic volumes which are generated by the remainder of the Rancheria.

### *Casino Project Trip Generation*

As **Table 5.4-6** shows, it is projected that the proposed hotel and casino would generate a total of 9,918 trips during a typical weekday of the peak month, 739 of which would occur during the AM peak hour, and 1,219 of which would occur during the PM peak hour. On a Saturday during the peak month of the project, it is projected that the Proposed Project would generate 14,600 trips, 1,691 of which would occur during the peak hour. The methodology for establishing these estimates was established as part of the detailed traffic study prepared for this EIR. The methodology is hereby incorporated by reference from the technical study,

which can be reviewed during normal business hours at Caltrans' District 3 Office located at 2800 Gateway Oaks, Sacramento, CA.

**Table 5.4-6 Casino-Hotel Project Trip Generation**

| Time Period | Size | Rate | In/Out Split | Trip Generation | | |
|---|---|---|---|---|---|---|
| | | | | In | Out | Total |
| **Casino Trip Generation** | | | | | | |
| Weekday | 238.5 ksf | 39.43 | ---------- | ------- | ------- | 9,404 |
| Saturday | 238.5 ksf | 59.07 | ---------- | ------- | ------- | 14,088 |
| Weekday AM Pk Hr | 238.5 ksf | 2.95 | 70% / 30% | 493 | 211 | 704 |
| Weekday PM Pk Hr | 238.5 ksf | 4.95 | 53% / 47% | 626 | 555 | 1,181 |
| Saturday AM Pk Hr | 238.5 ksf | 6.90 | 46% /54% | 757 | 889 | 1.646 |
| **Hotel Trip Generation(1)** | | | | | | |
| Weekday | 250 Rooms | 2.06 | ---------- | ------- | ------- | 514 |
| Saturday | 250 Rooms | 2.05 | ---------- | ------- | ------- | 512 |
| Weekday AM Pk Hr | 250 Rooms | 0.14 | 61% / 39% | 21 | 14 | 35 |
| Weekday PM Pk Hr | 250 Rooms | 0.15 | 53% / 47% | 20 | 18 | 38 |
| Saturday AM Pk Hr | 250 Rooms | 0.18 | 56% / 44% | 25 | 20 | 45 |
| **Total Trip Generation** | | | | | | |
| Weekday | | | | ------- | ------- | 9,918 |
| Saturday | | | | ------- | ------- | 14,600 |
| Weekday AM Pk Hr | | | | 514 | 225 | 739 |
| Weekday PM Pk Hr | | | | 646 | 573 | 1,219 |
| Saturday AM Pk Hr | | | | 782 | 909 | 1,691 |

*Source:* David Evans and Associates, 2001.
*Notes:* ksf = 1,000 square feet
(1) = Trip rates based on ITE Trip Generation – Hotel (Land Use 310). Rate reduced by 75% to account for internal capture to/from casino.

Subsequent to the initial establishment of trip generation for this study, additional research was conducted to validate trip generation assumptions. Some parties have publicly stated that the proposed hotel and casino would generate over 17,000 trips per day instead of the of 9,918 weekday trips assumed within this analysis. The following research and analysis (which is provided in more detail within the technical study) helps to verify that the trip generation assumptions used within this report are reasonable and conservative, and helps illuminate how erroneous conclusions might be mistakenly drawn by others from similar research.

(1) San Diego Casino Study - The San Diego County Department of Public Works prepared a study of casino trip generation titled "*Report on the Potential Impacts of Tribal Gaming on Northern and Eastern San Diego County*." The traffic study portion of this report, which was included as an appendix, was titled "*Preliminary Traffic Assessment of Indian Gaming Projects in the San Diego Region*" dated October 17, 2000. Due to confusion regarding the

specific criteria used in preparing this study, David Evans and Associates contacted the licensed traffic engineer serving as the project manager for this study. The project manager stated that the November 1, 2000 report which has been referenced within comments was only a preliminary report, and that the assumptions used regarding trips rates have since been revised. Additionally, it is important to note that the preliminary San Diego report did not specifically differentiate between the square footage of the ENTIRE casino facility vs. the square footage of ONLY the gaming floor area. This distinction is crucial when comparing trip generation rates. The project manager stated that since the submittal of the preliminary report, they have established that the 130 trips/1,000 sq. ft. of casino they used previously was with respect to the square footage of ONLY the gaming floor area, and not the square footage of the ENTIRE casino. Trip generation rates associated with the ENTIRE square footage of the casino would logically be significantly smaller than rates associated with the square footage of ONLY the gaming floor area due to the inclusion of square footage associated with ancillary uses such as restaurants, banking facilities, day care, offices, rest rooms, lobby areas, retail, etc. San Diego County is in the process of revising their earlier report with a more detailed report using more refined numbers, which will specify that the trip generation rates used are relative to the square footage of ONLY the gaming floor area. The project manager stated that they will be revising their trip generation rate down to 100 trips/1,000 square feet of gaming floor area. The ENTIRE Shingle Springs casino, including all ancillary uses (but excluding the hotel) is proposed to be 238,500 sq. ft., whereas the gaming floor area is proposed to include only 82,800 sq. ft. If the 82,800 sq. ft. of ONLY the gaming floor area of Shingle Springs was used, the trip rate (assuming the total trip generation were held constant) would be 113.57 trips/ksf, which is almost 14% higher than the trip rate which is being used within the revised San Diego report. The project manager also stated that the revised San Diego study will also assume an internal capture for a mixed hotel/casino, although a slightly more conservative rate of 3.0 trips/room for an average weekday will be added to casino hotel trip generation.

(2) Mystic Lake Casino - David Evans and Associates located trip generation calculation research for Mystic Lake Casino-Hotel, a large stand-alone Indian gaming casino facility in southwestern Minnesota. This research was included within the *"St. Croix Meadows Racing Park Proposed Casino Traffic Impact Study; Hudson, Wisconsin"* (also called the Hudson Casino) prepared by BRW within the past 2 years. The Mystic Lake Casino-Hotel is also a very large complex, and very similar in nature to the proposed Shingle Springs casino, with a total size of 447, 600 sq. ft., 101,500 sq. ft. of gaming floor area, 416 room hotel, and 3,916 gaming positions. Trip rates were established based on surveys of existing weekday PM peak hour, and Saturday peak hour trips which are currently visiting the facility. Because this facility is large, it is assumed that trip rates experienced at the facility would provide a

reasonable check of peak hour trip rates used for the Shingle Springs analysis. The trip rates assumed for the Shingle Springs Casino are 25% higher for weekday PM peak hour conditions, and 57% higher than Saturday peak hour conditions than actually occur at the Mystic Lake Casino-Hotel. Thus, from this perspective, the peak hour trip rates used for the Shingle Springs facility are considered to be reasonable and conservative.

(3) ITE Article - An article published within the May, 1992 Institute of Transportation Engineers Journal titled "*Trip Generation Rates for Las Vegas Area Hotel-Casinos*" was referenced to see how trip generation rates for the proposed Shingle Springs Casino corresponded to the findings within the article. Trip characteristics for "all hotel-casinos" analyzed as part of the study, rather than "strip hotel-casinos," were used for comparisons since they included rural casinos in outlying areas, and off-strip casinos with 200-300 rooms, as well as strip casinos. Within this study, trip generation rates for entire hotel-casino complexes were established using three separate variables (1) number of hotel rooms, (2) employees, (3) thousand square feet of casino gaming floor area. When average together, it can be seen that fitted curve equations within the article result in an average number of trips which are 32-35% lower than those which were actually used for Shingle Springs. Thus, from this perspective, the peak hour trip rates used for the Shingle Springs facility are considered to be conservative.

(4) ITE Casino Trip Generation Report - A write up regarding trip generation rates for the Shingle Springs study was submitted to a member of the technical advisory committee which helped to put together a report prepared for the Institute of Transportation Engineers titled "*Casino Trip Generation*." This report is currently undergoing final review and is expected to be published in the near future. This individual reviewed the trip generation assumptions used within the Shingle Springs study and verified that the rates and methodology were fully consistent with this report, and that in his opinion, the rates used, and trips generation volumes calculated, were very conservative for a facility this size. He also verified that an assumption of approximately 2 trip/room (25% of the trip generation vs. a stand alone hotel) is reasonable.

As the research and analysis above indicates, the trip generation assumptions within this report (including 9,918 weekday trips) are reasonable and conservative. Additionally, the discussion above shows that great care must be taken when comparing assumptions used within this analysis against those drawn from other sources. As shown, it is important that data be used correctly. For example, it is important that trip generation based on rates established for the square footage of the gaming floor area be carefully distinguished from those established for the square footage of an entire casino. Similarly, it is important that

allowances be made for the mixed nature of the project, and recognized that a combined casino-hotel will draw significantly less traffic than the combined traffic associated with a similar sized stand alone casino and stand alone hotel.

### *Peak Hour Trip Distribution and Assignment*

#### *Peak Hour Trip Distribution*

Peak hour trip distribution of hotel and casino project generated traffic is based on information in the Urban Systems Marketing Study, and the geographical location of population centers from which the casino is expected to draw both customers and employees. Based on this criteria, a significant percentage of the casino's traffic is expected to originate from the Sacramento/San Francisco Bay area.

Based on this criteria, peak hour trips to and from the proposed casino project (for analysis of impacts within the immediate vicinity of the project) were distributed as follows:

- 80% to/from the west (Sacramento/San Francisco Bay area)
- 20% to/from the east (Placerville/South Lake Tahoe area)

Casino project trips as assigned to the two proposed freeway interchange intersections for weekday AM and PM peak hours, and the Saturday peak hour, are depicted in **Figure 5.4-1**.

#### *Peak Hour Passer-By Diversion*

Not all of the traffic to and from the proposed casino project would be newly generated trips. A significant percentage of the through traffic on Highway 50 consists of vehicles traveling to and from Lake Tahoe, and a large percentage of these trips have a known propensity to gamble. Also, Shingle Springs will be an attractive stop for vehicles traveling a significant distance to and from locations such as the Bay Area, Stockton, etc. Thus, many of the people visiting the casino will be people who would have already been on the freeway en route to other existing casinos or recreational activities, particularly east of the project site including in large part the Tahoe area. Therefore, the trip generation calculated for the proposed casino must be adjusted before assigning the trips to the freeway. In other words, although 100% of the trips generated by the hotel and casino would be assigned as new trips to the ramps, intersections, and roadways of the new interchange, only a percentage of these trips should be assigned to US-50 as new trips since a significant percentage are assumed to already exist on the freeway. Without the new interchange and casino, these trips would have continued past the new interchange along US-50. With the new interchange and casino, it is assumed some of these trips will be intercepted or diverted to the new casino.

*See Figure 5.4-1*

For this traffic analysis, it was conservatively assumed that 40% of peak hour trips generated by the proposed casino project would be trips which are already assumed to exist within existing (and future projected baseline) US-50 traffic volumes during peak hours. Following the completion of the casino and interchange, this 40% is assumed to stop at the site rather than continuing past the site, which they would do in the absence of the development. This assumed passer-by capture rate was established by Caltrans in consultation with the traffic consultant. The detailed methodology establishing the passer-by capture rate was established in the detailed traffic study prepared for this EIR and is hereby incorporated by reference. The technical study can reviewed during normal business hours at Caltrans' District 3 Office located at 2800 Gateway Oaks, Sacramento, CA.

### *Daily Trip Distribution and Assignment*

To establish daily trip distribution to local roads, it was necessary to disaggregate the total number of project trips into various trip types to differentiate between newly generated trips and those which are assumed to already be on US-50 as passer-by trips. To do this, the total daily project traffic volumes for an average weekday during the peak month were used:

9,404 casino trips + 514 hotel trips = **9,918 TOTAL trips**

Trips generated by the hotel and casino were broken down into categories and assigned to highways and local roadways within El Dorado County as shown in **Table 5.4-7**

**Employee Trips** to both the casino and hotel were established assuming a total of 1,500 casino employees (including full time administrative staff) and an additional 200 hotel employees. It was assumed that on an average weekday that 550 casino employees, 200 administrative employees, and 90 hotel employees would travel to and from the site. It was assumed that each employee vehicle would include 1.2 people, and that each vehicle would make a total of 2.2 trips per day. Employee trips were distributed using the County's travel forecast model, which distributed traffic volumes to US-50 interchanges as shown in **Table 5.4-8**.

**Local & Regional Gamer Trips** are defined as trips where a gamer's trip originated generally from their residence. These trips were established through use of market forecasts as described within the Marketing Study performed by Urban Systems. This study carefully analyzed the potential gaming market and the likely locations where gamers would be drawn from. Factors such as distance from the proposed casino, the propensity for gaming by residents in certain locations, and the influence of competing casinos such as Jackson

## Table 5.4-7 Shingle Springs Average Daily Trip Generation

| Trip Type | | Avg. Week Day Trips |
|---|---|---|
| Employees (Assume Hotel = 10%) | | 1,375 |
| Gamers - Local Residents (El Dorado Co. & vicinity) | | 965 |
| Gamers - Regional Residents (SF, Sacramento, etc.) | | |
| | (West along US-50) | 4,565 |
| | (North along SR-49) | 199 |
| | (South along SR-49) | 135 |
| Gamers - Tourists | | |
| | Visiting Friends & Family | 48 |
| | Business | 169 |
| | Conventioneers | 14 |
| | Vacationers | 37 |
| Recreation by Hotel Guests | | 304 |
| Other Hotel (Non Employee/Recreation) | | 72 |
| Buses | | 20 |
| Deliveries | | 20 |
| Traffic Diversion of "Passing Through" Traffic | | 1,995 |
| **Total** | | **9,918** |

*Source:* David Evans and Associates, 2001.

Rancheria and the proposed Auburn Rancheria were considered. The exact locations of gamers was delineated as much as was necessary to determine the exact roadways in which

gamers would arrive at the project site. For example, all of the gamers from the San Francisco, Sacramento, and Stockton areas would arrive via US-50, whereas gamers in the Rocklin, Auburn area have a choice between SR-49 and US-50 (via Auburn-Folsom Rd,Sunrise Blvd, Hazel Ave, etc.). Local gamer trips were separated from regional gamer trips and distributed onto the local roadway network using the County's travel forecast model, in the same manner in which employees were distributed. It is assumed that gamers and employees living in the immediate vicinity of the project will be distributed in a similar manner since each is a function of the location of local residential development.

**Tourist Gamer Trips** are defined as gamers who are visiting the northern California area. These can be separated into people visiting family and friends in Northern California, people visiting the area on business or attending conventions, and people who are vacationing in the area. For purposes of this study, it is assumed that most of the business people and conventioneers will be arriving at the site from locations west of El Dorado County (i.e. Sacramento). It is also assumed that 80% of the tourist gamers visiting family and friends would also be arriving from the west, with the remaining 20% assumed to be visiting family and friends within El Dorado County (and thus also distributed to local roadways using the

## Table 5.4-8 Local Trip Distribution (Employees & Local Gamers)

| US-50 Interchange/Intersection | Cumulative % | | % to/from South | Total % to/from Interchange | % to/from North |
|---|---|---|---|---|---|
| | *9.1%* | *(Continuing West)* | | | |
| 1. El Dorado Hills Blvd / Latrobe Rd | | <--- | 2.0% | 9.8% | 7.8% |
| | 18.9% | | | | |
| 2. Bass Lake Rd | | <--- | 0.6% | 1.4% | 0.8% |
| | 20.3% | | | | |
| 3. Cambridge Rd | | <--- | 0.1% | 3.0% | 2.9% |
| | 23.3% | | | | |
| 4. Cameron Pk Dr | | <--- | 2.0% | 12.0% | 10.0% |
| | 35.3% | | | | |
| 5. Ponderosa Rd / S. Shingle Rd | | <--- | 5.5% | 14.3% | 8.8% |
| | 49.6% | | | | |
| 6. E. Shingle Springs Dr | | <--- | 3.5% | 7.0% | |
| | *53.1%* | *(to/from west)* | | | |
| **New Shingle Springs Rancheria Interchange** | | | | | |
| | *46.9%* | *(to/from east)* | | | |
| 7. Greenstone Rd | | <--- | 7.9% | 12.8% | 4.9% |
| | 34.1% | | | | |
| 8. El Dorado Rd | | <--- | 0.6% | 0.9% | 0.3% |
| | 33.2% | | | | |
| 9. Missouri Flat Rd | | <--- | 9.3% | 13.2% | 3.9% |
| | 20.0% | | | | |
| 10. Placerville Dr / Forni Rd | | <--- | 1.3% | 6.0% | 4.7% |
| | 14.0% | | | | |
| 11. Main St | | <--- | 0.2% | 1.0% | 0.8% |
| | 13.0% | | | | |
| 12. SR 49 | | <--- | 2.1% | 3.4% | 1.3% |
| | 9.6% | | | | |
| 13. Bedford Ave | | <--- | 0.8% | 2.2% | 1.4% |
| | 7.4% | | | | |
| 14. Mosquito Rd | | <--- | 0.9% | 2.0% | 1.1% |
| | 5.4% | | | | |
| 15. Schnell School Rd | | <--- | 0.8% | 1.3% | 0.5% |
| | 4.1% | | | | |
| 16. Point View Dr | | <--- | 0.6% | 0.8% | 0.2% |
| | 3.3% | | | | |
| 17. Carson Rd | | <--- | 0.4% | 0.7% | 0.3% |
| | 2.6% | | | | |
| 18. Carson Rd (@ Barkely) | | | | 0.7% | 0.7% |
| | 1.9% | | | | |
| 19. Carson Rd (@ Pony Express Tr) | | | | 0.4% | 0.4% |
| | 1.5% | | | | |
| 20. Pony Express Tr | | | | 0.5% | 0.5% |
| | 1.0% | | | | |
| 21. Sly Park Rd | | <--- | 0.3% | 0.6% | 0.3% |
| | *0.4%* | *(Continuing East)* | | | |

*Source:* 1999 El Dorado County travel forecast model.

County's travel forecast model). Finally, people who are vacationing in the area were assumed to arrive from local points of recreation (described below). Most of the trips associated with Tourist Gamers were assumed to be arriving at the site from locations west of

El Dorado County, although a portion of the trips were assigned to local roadways within El Dorado County.

**Recreation Trips by Hotel Guests** are based on the assumption that some of those people who are staying at the hotel (whether they are gamers or not) will visit one or more of the many recreational spots in the area. Assuming that each hotel guest party (i.e. 1 occupied room) stays an average of 1.75 days, and assuming that each party makes 1.25 recreation oriented trips per stay, an average of 304 trips per day (inbound plus outbound) would be generated by the project. Extensive research was performed regarding the various recreational choices in the area, and the number of visitors to each. Using this information, as well as input from the El Dorado County Chamber of Commerce, recreational trips by guests were distributed to roadways to and from the destinations shown in **Table 5.4-9**.

**Other Hotel Trips** are trips associated with that portion of trips related specifically to the hotel, which are over and above project trips calculated specifically in connection with the casino. Other hotel trips are the remainder of hotel trips after deductions for hotel employee trips (assumed as 10% of the projected 1,500 employees), and recreation trips as described above. As discussed elsewhere, 75% of trips associated with the hotel are assumed to be trips which would have been generated by the casino with or without the hotel. Most of these trips were assumed to be arriving at the site from locations west of El Dorado County.

**Bus Trips** are assumed to number, on average, 20 per day based on information included within the Marketing Study performed by Urban Systems. It is assumed that these trips would be arriving at the site from locations west of El Dorado County.

**Delivery Trips** are assumed to number, on average, 20 per day based on information provided by the shipping and receiving department of a similar northern California casino. It is assumed that these trips would be arriving at the site from Placerville.

**Traffic Intercept Trips** are the most difficult component of the traffic to establish. Although the previous traffic study assumed a passer-by capture rate of 40% along US-50, a more refined calculation was established which took into account the assumed passer-by capture for each individual trip type generated by the project. The following details this breakdown.

Urban Systems Marketing Study concluded that 8% of “through” vehicular traffic passing along US-50 would be captured (excluding both commuter traffic and truck traffic). Based on research conducted by Urban Systems, it is assumed that 65% of traffic along US-50 in the vicinity of the project is commuter oriented. Additionally, Caltrans truck volume data

## Table 5.4-9 Hotel Recreation Trip Distribution

| Recreation Choice | Percentage |
|---|---|
| Downtown Placerville (Antiques, Museums, Restaurants, Shopping, etc.) | 25% |
| Apple Hill (+ North County Wineries) | 13% |
| Coloma area North County Wineries | 1% |
| South County Wineries | 8% |
| Marshall Gold State Park | 12% |
| Gold Bug Park | 3% |
| White Water Rafting (Coloma Put In) | 3% |
| White Water Rafting (Chili Bar Put In) | 2% |
| Golf (El Dorado Hills Golf Course) | 2% |
| Golf (Apple Mtn Golf Course) | 3% |
| Other Misc. Attractions (in western & central El Dorado Co.) | 5% |
| South Lake Tahoe & other attractions in East County (east along US-50) | 8% |
| Sacramento & Folsom (west along US-50) | 10% |
| Auburn (and other pts north along SR-49) | 3% |
| Yosemite (& other pts south along SR-49) | 2% |
| **TOTAL** | 100% |

*Source:* David Evans and Associates, 2001.

shows that 6% of the volumes along US-50 in the vicinity of the project are trucks. Based on 2000 Caltrans counts, the average annual daily traffic volumes along US-50 between Shingle Springs and Greenstone Road is 43,000 vehicles. Thus, as the following calculation shows (**Table 5.4-10**), there are 12,470 through vehicular (non-truck) trips on an average weekday.

## Table 5.4-10 Average Daily Trip Generation

| | |
|---|---|
| **2000 AADT on US-50 between Shingle Springs & Greenstone** | **43,000** |
| Commuter Traffic = 65% | 27,950 |
| Through Traffic = 35% | 15,050 |
| Truck Traffic = 6% | 2,580 |
| **Through Vehicular (Non-Truck) Traffic** | **12,470** |
| Traffic which Casino will Intercept = 8% | 1,000 |
| **Trips due to traffic intercept (2 trip ends/vehicle)** | **2,000** |
| Total Shingle Springs Trip Generation (Average Weekday) | 9,918 |
| **% of Average Daily Trip Generation** | **20.2%** |

*Source:* David Evans and Associates, 2001.

If it is assumed that the project captures 8% of this traffic, then 20.2% of the trips generated by the project on an average weekday are due to the "capture" of passing through traffic.

These trips do not fall into any other category, and thus are assumed to be simply "passer-by capture of through vehicular volumes" trips.

It is important to note, however, that other trips generated by the project will also exist on US-50, and thus should not be added to trip generation volumes on US-50. **Table 5.4-4** breaks down the various types of trips which are assumed would already exist along US-50, and which would be either diverted or intercepted by Shingle Springs. These trip type percentages are based in large part on information provided by Urban Systems both within the Marketing Study and verbally. However, additional assumptions are based on assumptions considered to be reasonable for the project.

As the **Table 5.4-11**, it is assumed that almost 39% of the trips which the project would generate on an average weekday would already be present on US-50. This is slightly less than the 40% passer-by capture assumed for peak hour conditions. It is expected that the passer-by capture during peak hours is higher than daily conditions due to increased traffic volumes and congestion during the peak hours, at which time the casino would provide an even higher degree of attraction as a means of waiting out congestion.

It is important to note that the total number of project trips was established through careful research of trip generation characteristics at other casino facilities, some of which includes hotels. Trip generation rates were established by conducting counts of traffic entering and exiting driveways at other casinos, which would thus include every type of trip possible including each of the various types of project trips described above such as the employee trips, recreation oriented trips, buses, deliveries, capture of passerby volumes, and obviously gamer trips. It is important to note that in realty the exact number of trips which would correspond to any specific trip type can never be known with certainty, and in fact many trips would be spread out over the various trip types. It would be nearly impossible for a study of this magnitude, with the complexity and variety of trips generated, to be broken down perfectly into each exact trip type. However, the assumptions, trip allocations between trip types, and distribution and assignments to highways and local roadways represents the analyst's best faith effort to reasonably identify all trip types, and simulate traffic conditions with the project. The analysis reasonably represents the manner in which trips would be generated and distributed "as a whole." The breakdown into trip types simply represents the best analytical approach to reasonably distribute trips.

**Table 5.4-11 Passer-By Capture % by Trip Type**

| Passer-by-Capture | Percent |
|---|---|
| Passer-By Capture (Through Vehicular) includes gamers with South Lake Tahoe as primary destination | 20.1% |
| "Intercepted Trips" associated with Bay Area, Sacramento, and Stockton gamers who would have been traveling to South Lake Tahoe casinos, but instead will visit Shingle Springs. (12% of trips as defined) | 5.5% |
| "Diverted Trips" associated with Bay Area, Sacramento, and Stockton gamers who would have gone to South Lake Tahoe casinos in the absence of Shingle Springs, is visiting Shingle Springs as a primary destination instead, but will still continue to Tahoe as a secondary destination (4% of trips as defined) | 1.8% |
| "Intercepted Trips" associated with El Dorado County area gamers who would have gone to South Lake Tahoe casinos in the absence of Shingle Springs, but instead will visit Shingle Springs. (63% of trips as defined) (Note: Capture rate varies along US-50 within El Dorado County) | 6.1% |
| "Diverted Trips" associated with Employees who are assumed would have been on US-50 to/from other jobs in the area (25% of trips as defined) | 3.5% |
| "Diverted & Intercepted Trips" associated with Gamers who are Tourists visiting family and friends (20%), in area on Business (10%), in area attending Conventions (10%), in area Vacationing (25%) | 0.4% |
| Misc. "Diverted & Intercepted Trips" associated with Hotel Guests participating in area Recreation (25%), other misc. Hotel related trips (50%), Buses (50%), and Deliveries (100%) | 1.4% |
| **Total Passer-By Capture** | **38.8%** |

*Source:* David Evans and Associates, 2001.

## *Significance Criteria*

### *Caltrans Route Concept Report*

The target level of service for this analysis is based primarily on *Caltrans' State Route 50 Transportation Concept Report*, issued in April. The report includes the following text which describes Caltrans' goals and objectives for US-50 within El Dorado County, specifically within the vicinity of the proposed interchange.

> *Segment 6 consists of a four-lane divided freeway from the Sacramento/El Dorado County Line to the West Placerville Undercrossing. The terrain is predominantly rolling (some steep grades).*
>
> *This segment carries the greater share of commuter travel emanating from El Dorado County. Although this segment stretches to just west of Placerville, the primary focus for this segment is on the commuter travel shed which lies between the Sacramento/El Dorado County Line to Ponderosa, near Shingle Springs. The increases in commute travel volumes arise from the growing communities of El Dorado Hills, Bass Lake, Cameron Park, and Shingle Springs which act as bedroom communities to employment centers in Sacramento County, i.e., Folsom, Rancho Cordova. The remainder of the segment carries relatively lower commute traffic volumes, and travel patterns turn mostly interregional and recreational in nature. This segment overall*

*operates at an acceptable LOS E. However, the western portion of this segment often, during peak periods, falls to LOS F. The level of service for the entire segment is expected to drop to "F" by the year 2007. By the year 2017, it is estimated that demand will exceed the capacity of the facility by 1.63 times with two or more hours of delay.*

** Implementation of the Concept Improvements, i.e., six-lane freeway with HOV, in conjunction with additional local parallel facilities, light-rail extensions, etc., will not provide this segment with LOS E the entire twenty-year period. It will be necessary, therefore, to examine the need to further expand this segment of SR 50 prior to the conclusion of the planning period rather than beyond the twenty-year period.*

*SACOG U.S. 50 CORRIDOR STUDY: On December 18, 1997, the SACOG Board adopted the strategies in the Investment Strategy for the U.S. Corridor Major Investment Study. The study evaluated long-term investment strategies including light-rail extensions, alternative phasing strategies for carpool lanes, and transportation management strategies within the SR 50 Corridor from downtown Sacramento to El Dorado Hills in El Dorado County.*

*Relative to Segment 6, the findings of the study identified the following Tier 1 strategy project (projects for early funding consideration from regional or discretionary sources – in priority order): Priority No. 8 – HOV lanes on U.S. 50 between Prairie City Road and El Dorado Hills Boulevard ($9.4 million). Under Tier 2 (projects to be considered for Regional or Discretionary Funds), the study also recommended transportation management strategies and operational policies to be implemented or studied.*

The *Route 50 Transportation Concept Report* states that the concept level of service for US-50 between Sacramento and Placerville is LOS E. Thus for this analysis, LOS below this level (LOS "F") would be considered an unacceptable condition.

### *Standards of Significance - Freeway Mainline and Freeway Ramps*

At the direction of Caltrans staff, the concept level of service for freeway mainline and freeway ramp merge analysis is LOS E, thus LOS "F" is considered unacceptable for freeway mainline and merge analyses.

The target level of service for freeway ramp diverge analysis is a reduced LOS D, thus LOS "E" or "F" is considered unacceptable for diverge analyses.

### *Standards of Significance - Study Intersections*

In terms of the new intersections which may be a part of the proposed interchange, the applicable target level of service criteria for the new intersections would likely need to conform to Caltrans level of service standards. Using Caltrans concept level of service

criteria as described above, LOS D would logically be used as the target level of service for new intersections.

However, intersection levels of service should also be checked against the target level of service criteria established for El Dorado County. The 1996 El Dorado County General Plan states the following in Policy 3.5.1.1:

> *The County shall adopt a roadway plan consistent with planned land use and shall maintain an operating Level of Service of 'E' or better on all roadways, consistent with Objective 3.5.1. In addition, all road segments projected in the roadway plan at the year 2015 to be operating at LOS A, B, or C shall not be allowed to fall below LOS C and all road segments at LOS D shall not fall below LOS D.*

Therefore, LOS "C" is regarded as the target LOS for the newly created intersections. LOS below this level (LOS "D", "E" or "F") is considered an unacceptable condition.

### *Standards of Significance - Local Roads*

Potential impacts to local roads (including SR-49 SR-198) were analyzed using the following methodology, as established in coordination with El Dorado County traffic engineering personnel.

- Impacts to all "major roads" within El Dorado County were analyzed, as identified and included within both the *"El Dorado County General Plan Circulation Map"*, and the 1999 version of the "*El Dorado County Travel Demand Forecasting Model"* in MINUTP.
- Impacts were analyzed for existing and cumulative daily conditions.
- Roadway capacities, and resulting levels of service, were established through use of spreadsheets associated with the El Dorado County model.
- Roadway geometries, and corresponding capacities, for cumulative conditions are based on the roadway network geometries included within the 2022 CIP (Capitol Improvement Program) data network files contained with the 1999 El Dorado County travel demand model.
- A roadway was assumed to be impacted, but not necessarily "significantly impacted" by the project, if it added more than 2% to the existing roadway volume.
- A roadway was assumed to be significantly impacted by the project if it <u>also</u> met any of the following criteria:
  a) Degrading from acceptable LOS (A,B or C) without the project to an unacceptable LOS (D,E or F) with the project
  b) Degrading from unacceptable LOS D without project to unacceptable LOS E with the project, when the cumulative LOS is D or better (as defined within the 2015 CIP)
  c) Degrading from unacceptable LOS D without project to unacceptable LOS F with project

d) Degrading from unacceptable LOS E without project to unacceptable LOS F with the project
e) Unacceptable LOS F both without and with the project

Impacts along US-50 from the Sacramento/El Dorado County line to east of the project site are based on the concept level of service E, established within *Caltrans' State Route 50 Transportation Concept Repo*rt and additional information provided by Caltrans. Thus LOS F is considered an unacceptable level of service for US-50.

### *Impacts/Mitigation*

### *Impact 5.4-1 Existing Plus Project- Ramp Merge/Diverge Operations*

AA There would be ***no impact*** associated with the No Project Alternative.

AB Freeway ramp merge/diverge analysis were analyzed two different ways to provide for a comparative analysis. The first method of analysis calculates ramp merge/diverge operations for rolling terrain, and does not take into account the specific grades and grade lengths; whereas the second method uses actual specific grades and grade lengths of the freeway leading up to the ramp, and along the ramp itself.

For detailed analysis which takes into account the specific grade and grade lengths of the freeway and ramp in establishing ramp merge/diverge operations, the grade length is calculated by taking the straight portion of the grade leading to (and perhaps continuing past) the ramp juncture point, and adding to this value ¼ of the vertical curves at both the beginning and end of the grade.

Although level of service analysis as included within HCS (Highway Capacity Software) also provides for the input of specific ramp grade and length, this data is negligible in terms of the analysis unless the volume along the ramp approaches the capacity of the ramp. Within the analyses included within this report, it was found that the specific grade and length of the ramps itself were negligible in terms of the level of service of the ramp merge/diverge.

Freeway ramp merge/diverge analysis also provides for the consideration of interference to traffic flow and capacity based on the location of adjacent freeway ramps, and the traffic volumes to and from them. For 4-lane freeway merge/diverge analysis, the length to the adjacent ramp and the volume on the adjacent ramp does not impact the result in anyway since the equation used to calculate level of service does not include this variable. Thus, although a

distance to the adjacent ramp may be provided within 4-lane merge/diverge analysis, the value is irrelevant in terms of the level of service calculation.

A free flow speed of 48 kph (30 mph) was used for both project alternatives. This default value was used to approximate the design speed of 80 kph (50 mph) at inlet and exit noses of the ramps associated with Alternative AB, and 45 kph (28 mph) along the remainder of ramp.

Ramp merge/diverge analyses are performed only along the peak direction of travel for weekday peak hour conditions, which is along the westbound direction during the AM peak hour, and the eastbound direction during the PM peak hour. Ramp merge/diverge analyses are performed along both directions of travel for the Saturday peak hour. Analyses were not performed along the non-peak direction of travel following consultation and approval of Caltrans personnel.

**Table 5.4-12** provides a summary of freeway merge/diverge operations for all three peak hour scenarios following the completion of the proposed interchange and proposed hotel and casino. The ramp merge/diverge level of service is applicable to all three scenarios, and uses "rolling terrain" to establish levels of service. The levels of service depicted are based on minimum acceleration/deceleration lengths of 250 ft. (76 meters).

As the table below shows, all of the ramps are projected to operate acceptably at LOS D or better during all three peak hour scenarios for existing conditions with the new interchange and casino/hotel.

### Table 5.4-12 Existing plus Project Freeway Ramp Level of Service (Rolling Terrain)(1)

| Ramp | Level of Service | | |
|---|---|---|---|
| | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
| Eastbound off-ramp | ------ | D | D |
| Eastbound on-ramp | ------ | D | C |
| Westbound off-ramp | C | ------ | C |
| Westbound on-ramp | C | ------ | C |

*Source:* David Evans and Associates, 2001.
*Notes*: Length of deceleration and acceleration lanes assumed to be 250 ft. (76 meters)
(1) Level of service calculated using generalized "rolling" terrain instead of exact specific grade/length.

**Table 5.4-13** provides a similar summary of freeway merge/diverge operations, but is based on the use of the specific grade and grade length along

the freeway. As previously described, it has been determined that the levels of service reported are the same for both alternatives. Again, the levels of service depicted are based on minimum acceleration/deceleration lengths of 250 ft. (76 meters).

**Table 5.4-13 Existing plus Project Freeway Ramp Level of Service (Specific Grade/Length)(1)**

| Ramp | Specific Grade | Specific Length (ft) | Level of Service | | |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
| Eastbound off-ramp | +4.38 | 2,525 | ------ | D | D |
| Eastbound on-ramp | +2.28 | 1,150 | ------ | C | C |
| Westbound off-ramp | -2.28 | 1,150 | C | ------ | C |
| Westbound on-ramp | -4.38 | 2,525 | C | ------ | C |

*Source:* David Evans and Associates, 2001.
*Notes*: Length of deceleration and acceleration lanes assumed to be 250 ft. (76 meters)
(1) Level of service calculated using exact specific grade/length instead of generalized "rolling" terrain.

As both of the above table shows, the freeway ramp merge/diverge areas for the new interchange are projected to operate acceptably at LOS D or better during all three peak hour scenarios for existing conditions with the new interchange and casino/hotel, regardless of whether they are analyzed using rolling terrain or specific grade/length. Therefore, this is considered a ***less-than-significant impact***.

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB. Therefore, a ***less-than-significant impact*** will result.

Because of the methodology used to calculate the specific grade and grade length along the freeway, minor differences in the location of the ramp juncture points for each alternative do not change the length of the grade. Therefore, the specific grade and length of the ramps itself were negligible in terms of the level of service of the ramp merge/diverge, and the same specific grade and grade length along the freeway are applicable to analyses for both alternatives. To verify, a detailed analysis was performed for Alternative AB, and a trial and error input of the other possible input values for the Alternative AC was performed. This trial and error input included the ramp lengths, grades and volumes for Alternative AC, as well as extreme ramp lengths, grades and volumes outside the range of possibilities for Alternative AC. This trial and error analysis confirmed that the merge/diverge levels of service for

the all alternatives and peak hour scenarios correspond to those calculated for Alternative AB. Therefore, for analyses which provide for the input of specific grades and grade lengths, the same values are used for both alternatives since the input for each result in exactly the same level of service results.

### *Mitigation 5.4-1 Existing Plus Project- Ramp Merge/Diverge Operations*

None Required.

### *Impact 5.4-2 Existing Plus Project- Peak Hour Freeway Mainline Operations*

AA There would be ***no impact*** associated with the No Project Alternative.

AB **Table 5.4-14** shows the freeway mainline operations for all three peak hour scenarios following the completion of the proposed interchange and proposed hotel/casino. As the table shows, the freeway is projected to operate acceptably at LOS D or better during all three peak hour scenarios for existing conditions with the new interchange and casino/hotel. Therefore, this is considered a ***less-than-significant-impact***.

**Table 5.4-14 Existing Plus Project Freeway Mainline Level of Service**

| | Freeway Level of Service[(1)] | | | | | |
|---|---|---|---|---|---|---|
| | Existing (no project) | | | Existing plus Project | | |
| Freeway Segment | AM Pk Hr | PM Pk Hr | Sat Pk Hr | AM Pk Hr | PM Pk Hr | Sat Pk Hr |
| Eastbound US-50 (between E. Shingle Springs & Rancheria) | B | D | C | C | D | D |
| Eastbound US-50 (between Rancheria & Greenstone) | B | D | C | B | D | D |
| Westbound US-50 (between Greenstone & Rancheria) | D | C | C | D | C | C |
| Westbound US-50 (between Rancheria & E. Shingle Springs) | D | C | C | D | C | D |

*Source:* David Evans and Associates, 2001.
*Notes:* (1) Free Flow speed varies - "Ideal" Free Flow Speed of 65 mph adjusted to account for specific hwy geometry.

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB. As the above table shows, the freeway is projected to operate acceptably at LOS D or better during all three peak hour scenarios for

existing conditions with the new interchange and casino/hotel. Therefore, this is considered a ***less-than-significant impact***.

### *Mitigation 5.4-2 Existing Plus Project- Peak Hour Freeway Mainline Operations*

None Required.

### *Impact 5.4-3 Existing Plus Project- Interchange Intersection Operations*

AA There would be ***no impact*** associated with the no project alternative

AB Since there are no intersections associated with the Flyover Alternative, there would be ***no impact*** associated with the Flyover Alternative.

AC Interchange operations are analyzed only for Alternative AC, since the modified trumpet design of Alternative AB contains no intersections to analyze. If constructed as a diamond interchange as proposed for Alternative AC, the interchange would include two intersections.

*Unsignalized Intersection Analysis*

**Table 5.4-15** provides a summary of intersection operations following the completion of the interchange and hotel and casino for unsignalized intersections.

**Table 5.4-15 Existing plus Project Unsignalized Level of Service**

| Intersection | AM Peak Hour | | PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|
| | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) |
| New Shingle Springs Rancheria Road / Westbound ramps | A | (1.3) | A | (1.0) | A | (1.2) |
| New Shingle Springs Rancheria Road / Eastbound ramps | B | (5.3) | C | (11.8) | **F** | **(53.4)** |

*Source:* David Evans and Associates, 2001.
*Notes:* Applicable only for Alternative AC since Alternative AB includes no intersections. Delay for unsignalized intersections based on overall average vehicle delay.

As the table above shows, the eastbound ramp intersection would not operate at an acceptable level of service as an unsignalized intersection. Therefore, this is considered a ***significant mitigable impact***.

### *Signalized Intersection Analysis*

Both of the intersections would meet Caltrans signal warrants for rural conditions, although the westbound ramps are warranted only for weekday PM peak hour and Saturday peak hour conditions, and the eastbound ramps are warranted only for Saturday peak hour conditions. It is thus recommended that at a minimum the eastbound ramp intersection be signalized as part of the interchange construction. Although not necessary to provide acceptable level of service operation, it is also recommended that the westbound ramp intersection also be signalized to provide efficient operation.

**Table 5.4-16** below shows the level of service for the two intersections following signalization.

The signalized analysis was conducted using SYNCHRO software, which considered the effects of each of the two intersections upon each other.

### *Interchange Queuing Analysis*

Using the SYNCHRO analysis described previously, the queuing along each of the intersection approaches were analyzed. **Table 5.4-17** summarizes the queuing which would occur for Alternative AC along each of the intersection

**Table 5.4-16 Existing plus Project Signalized Level of Service**

| Intersection | AM Peak Hour | | PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|
| | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) |
| New Shingle Springs Rancheria Road / WB ramps | A | (3.4) | A | (3.6) | B | (6.8) |
| New Shingle Springs Rancheria Road / EB ramps | B | (8.1) | B | (6.7) | B | (8.4) |

*Source:* David Evans and Associates, 2001.
*Notes:* Applicable only for Alternative AC since Alternative AB includes no intersections.

approaches for existing conditions following the completion of the interchange project for signalized intersections.

As the below table shows, the queuing capacity for each of the approaches is expected to easily accommodate the projected queues for each of the peak hour scenarios for Alternative AC, with the exception of the southbound approach to the eastbound ramp intersection during Saturday peak hour conditions. Although the queue capacity is adequate for more than 50% of the Saturday peak hours (as shown by the 50th percentile queue), it would exceed the link capacity between the westbound and eastbound ramps during at least 5% of the Saturday peak hours (as shown by the 95th percentile queue). Even then, the excess queue would amount only to a single vehicle. This excess queue would in effect stretch through the westbound ramp intersection to the section of the new roadway north of the interchange. If signalized and coordinated with the signal for the eastbound ramps, the signal timing coordination could ensure that the eastbound ramp intersection would provide additional or offset green time to clear the westbound intersection. Additionally, even in a worse case scenario where traffic did extend through the westbound ramp intersection, these vehicles would not block any of the predominate movements through the intersection, since the other movements are associated primarily with southbound rights and westbound off-ramp right

**Table 5.4-17 Existing Plus Project Intersection Queuing for Signalized Intersections**

| Movement | Available Queue Capacity (ft) | AM Peak Hour Queue (ft) | | PM Peak Hour Queue (ft) | | Saturday Peak Hour Queue (ft) | |
|---|---|---|---|---|---|---|---|
| | | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile |
| **New Project Access / Westbound US-50 Ramps** | | | | | | | |
| Northbound | 163 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southbound Thru | 760+ | 8 | 26 | 25 | 65 | 45 | 91 |
| Southbound Right | 760+ | 20 | 59 | 52 | 133 | 131 | 336 |
| Westbound | 1,275 | 55 | 92 | 54 | 93 | 69 | 129 |
| **New Project Access / Eastbound US-50 Ramps** | | | | | | | |
| Southbound | 163 | 16 | 42 | 49 | 117 | 87 | **174 [11]** |
| Eastbound | 983 | 89 | 135 | 125 | 171 | 134 | 215 |

*Source*: David Evans and Associates, 2001.
*Notes:* Queue length exceeds queue capacity [excess queue in parenthesis]

turns to the Rancheria. The only movements which would potentially be blocked would be associated with vehicles which intended to use the interchange to reverse their direction of travel along US-50. If the interchange were congested to such a degree that this extreme queuing developed, it is doubtful anyone would negotiate this movement at this particular interchange at that time.

### *Mitigation 5.4-3 Existing Plus Project- Interchange Intersection Operations*

The impact identified above will be reduced to a ***less than significant*** level with the implementation of the following mitigation:

(A) It is recommended that the two newly created intersections under AC be signalized, and that the signals be coordinated to assure that queues would not develop which would block the westbound ramp intersection.

### *Impact 5.4-4 Existing Plus Project- Local Roads Analysis*

AA There would be ***no impact*** associated with the no project alternative.

AB This analysis has been developed in response to comments received during the NOP comment period that related to local roads impact. To assess the impacts on local roads in the County, several assumptions about the habits of visitors to the hotel and casino site needed to be made. The assumptions made for this analysis (see *Daily Trip Distribution and Assignment* section above) are based on the professional judgement of the project's traffic engineer, since visitor habits was not available through El Dorado County or the County Visitors Bureau. It should be noted that this type of analysis, requested by El Dorado County, has never been undertaken previously and represents the most complete local roads analysis that has been undertaken for an interchange project in El Dorado County.

**Table 5.4-18** provides a summary of all of the local roadway and highway segments within El Dorado County along which the project is projected to increase existing traffic volumes by 2% or more. The table also shows the resulting level of service along the roadway.

**Table 5.4-19** provides a summary of the portion of US-50 within El Dorado County along which the project is projected to increase existing traffic

## Table 5.4-18 Existing Local Roadway Impact Summary (Existing + Project Volumes 2% over Existing)

| Road/Segment | Geometry/Classification | Existing | | Project | | Existing + Project | |
|---|---|---|---|---|---|---|---|
| | | Daily Vol | LOS | Daily Vol | % Inc | Daily Vol | LOS |
| **Barkley Rd.** | | | | | | | |
| North of Carson Rd | 2-Lane Rural Local Rd | 1,009 | B | 21 | 2.1% | 1,030 | B |
| **Big Cut Rd.** | | | | | | | |
| Benham St to Quarry Rd | 2-Lane Rural Local Rd | 1,068 | B | 28 | 2.6% | 1,096 | B |
| **Buckeye Rd.** | | | | | | | |
| E. Shingle Springs to Mother Lode Rd (W) | 2-Lane Rural Local Rd | 201 | A | 59 | 29.4% | 260 | A |
| **E. Shingle Springs Rd.** | | | | | | | |
| US-50 to Buckeye Rd | 2-Lane Rural Local Rd | 1,886 | C | 83 | 4.4% | 1,969 | C |
| **Forni Rd.** | | | | | | | |
| Ray Lawyer Ext to Placerville Dr | 2-Lane Local Rural Rd | 902 | B | 18 | 2.0% | 920 | B |
| **Greenstone Rd.** | | | | | | | |
| Mother Lode to US 50 | 2-Lane Rural Minor Collector | 1,085 | B | 322 | 29.7% | 1,407 | B |
| US 50 to Green Vly Rd | 2-Lane Rural Minor Collector | 2,659 | D | 268 | 10.1% | 2,927 | D |
| **Green Valley Rd.** | | | | | | | |
| Lotus Rd to Greenstone | 2-Lane Urban Minor Arterial | 3,981 | D | 238 | 6.0% | 4,219 | D |
| **Larsen Rd.** | | | | | | | |
| Barkley Rd to North Canyon Rd | 2-Lane Rural Local Rd | 460 | B | 21 | 4.6% | 481 | B |
| **Lotus Rd.** | | | | | | | |
| Green Vly Rd to GoldHill Rd | 2-Lane Rural Minor Arterial | 7,760 | D | 224 | 2.9% | 7,984 | D |
| GoldHill Rd to Thompson Hill | 2-Lane Rural Minor Arterial | 4,860 | D | 207 | 4.3% | 5,067 | D |
| Thompson Hill to Bassi Rd | 2-Lane Rural Minor Arterial | 4,985 | E | 207 | 4.2% | 5,192 | E |
| Bassi Rd to SR 49 | 2-Lane Rural Minor Arterial | 4,985 | E | 207 | 4.2% | 5,192 | E |
| **Mother Lode Dr.** | | | | | | | |
| Greenstone to Pleasant Vly Rd | 2-Lane Rural Major Collector | 10,001 | E | 279 | 2.8% | 10,280 | E |
| **North Shingle Rd.** | | | | | | | |
| US 50 to Ponderosa | 2-Lane Urban Minor Arterial | 7,440 | E | 208 | 2.8% | 7,648 | E |
| **Old Frenchtown Rd.** | | | | | | | |
| French Crk to Mother Lode Dr | 2-Lane Rural Minor Collector | 1,301 | B | 28 | 2.2% | 1,329 | B |
| **Oxford Rd.** | | | | | | | |
| Cambrdige Rd to Cameron Park Dr. | 2-Lane Urban Collector | 3,609 | D | 85 | 2.4% | 3,694 | D |
| **Pleasant Valley Rd.** | | | | | | | |
| Mother Lode Dr to El Dorado Rd | 2-Lane Rural Minor Arterial | 8,045 | D | 250 | 3.1% | 8,295 | D |
| El Dorado Rd to SR 49 | 2-Lane Rural Minor Arterial | 9,680 | E | 243 | 2.5% | 9,923 | E |
| **SR 49** | | | | | | | |
| County Line to Sandridge | 2-Lane Rural Highway | 5,600 | C | 146 | 2.6% | 5,746 | C |
| Sandridge to Pleasant Valley Rd. | 2-Lane Rural Highway | 7,900 | E | 189 | 2.4% | 8,089 | E |
| US 50 to SR 193 (N) | 2-Lane Rural Highway | 5,000 | E | 152 | 3.0% | 5,152 | E |
| SR 193 (N) to Gold Hill | 2-Lane Rural Highway | 3,900 | D | 108 | 2.8% | 4,008 | D |
| Gold Hill Rd to Cold Springs | 2-Lane Rural Highway | 1,800 | C | 101 | 5.6% | 1,901 | C |

| Road/Segment | Geometry/Classification | Existing | | Project | | Existing + Project | |
|---|---|---|---|---|---|---|---|
| | | Daily Vol | LOS | Daily Vol | % Inc | Daily Vol | LOS |
| Cold Springs to Lotus Rd | 2-Lane Rural Highway | 1,800 | C | 112 | 6.2% | 1,912 | C |
| Lotus Rd to Marshall Rd. | 2-Lane Rural Highway | 4,300 | C | 235 | 5.5% | 4,535 | C |
| Marshall to Salmon Falls Rd | 2-Lane Rural Highway | 2,750 | B | 203 | 7.4% | 2,953 | B |
| Salmon Falls Rd to SR 193 | 2-Lane Rural Highway | 2,750 | D | 198 | 7.2% | 2,948 | D |

*Source*: David Evans and Associates, 2001.

## Table 5.4-19 Existing Local Roadway (US-50) Impact Summary (Existing + Project Volumes 2% over Existing)

| Road Segment | Geometry/ Classification | Existing | | Project | | Existing + Project | |
|---|---|---|---|---|---|---|---|
| | | Daily Vol | LOS | Daily Vol | % Inc | Daily Vol | LOS |
| **US Highway 50** | | | | | | | |
| County Line to EDHB/Latrobe | 4-Lane Freeway | 70,000 | D | 4,235 | 6.1% | 74,235 | D |
| EDHB/Latrobe to Bass Lake Rd | 4-Lane Freeway | 62,000 | D | 4,377 | 7.1% | 66,377 | D |
| Bass Lake Rd to Cambridge Rd | 4-Lane Freeway | 56,000 | C | 4,397 | 7.9% | 60,397 | C |
| Cambridge Rd to Cameron Pk Dr | 4-Lane Freeway | 55,000 | C | 4,439 | 8.1% | 59,439 | C |
| Cameron Pk Dr to Shingle Springs | 4-Lane Freeway | 57,000 | C | 4,607 | 8.1% | 61,607 | C |
| Shingle Springs to E. Shingle Spr | 4-Lane Freeway | 43,000 | B | 4,807 | 11.2% | 47,807 | C |
| E. Shingle Spr to New Interchange | 4-Lane Freeway | 43,000 | B | 4,856 | 11.3% | 47,856 | C |

*Source:* David Evans and Associates, 2001.

volumes by 2% or more (with the exception of US-50 between East Shingle Springs Drive and Greenstone Road, which is analyzed elsewhere for peak hour conditions). Traffic volumes east of Greenstone Road are not expected to increase by 2% or more. The table also shows the resulting level of service along the roadway using capacities as established within spreadsheets associated with the El Dorado County model.

Impacts along US-50 from the Sacramento/El Dorado County line to east of the project site are based on the concept level of service "E", established within *Caltrans' State Route 50 Transportation Concept Repo*rt and additional

information provided by Caltrans. Thus LOS F is considered an unacceptable level of service for US-50.

Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact any of the local roadways and highways (including US-50, SR-49, and SR-193) for existing conditions on an average weekday. Therefore, this is considered a ***less-than-significant impact***.

**AC** Impacts associated with Alternative AC are identical to those identified above for Alternative AB. Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact any of the local roadways and highways (including US-50, SR-49, and SR-193) for existing conditions on an average weekday. Therefore, this is considered a ***less-than-significant impact***.

### *Mitigation 5.4-4 Existing Plus Project- Local Roads Analysis*

None Required.

### *Impact 5.4-5 Cumulative Plus Project- Ramp Merge/Diverge Operations*

AA There would be ***no impact*** associated with the No Project Alternative.

AB **Table 5.4-20** provides a summary of cumulative freeway merge/diverge operations along the existing 4-lane freeway for all three peak hour scenarios following the completion of the proposed interchange and proposed hotel/casino. The ramp merge/diverge level of service is applicable to all three scenarios, and uses "rolling terrain" to establish levels of service. The levels of service depicted are based on minimum acceleration/deceleration lengths of 250 ft. (76 meters).

As the below table shows, both the eastbound and westbound on ramps are projected to operate acceptably along a 4-lane facility during all three peak hours. However, the eastbound off-ramp is projected to operate unacceptably at LOS F during the weekday PM peak hour and Saturday peak hour, and the westbound off-ramp is projected to operate unacceptably at LOS E during the AM peak hour. The principal reason for these deficient operations is the LOS F operation along the freeway mainline which results in unacceptable levels of service at the ramp merge/diverge region.

## Table 5.4-20 Cumulative Plus Project Freeway Ramp Level of Service (Rolling Terrain)[(1)]

| Ramp | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
|---|---|---|---|
| Eastbound off-ramp | ------ | **F** | **F** |
| Eastbound on-ramp | ------ | E | E |
| Westbound off-ramp | **E[(2)]** | ------ | D |
| Westbound on-ramp | E | ------ | E |

*Source*: David Evans and Associates.
*Notes:* Length of deceleration and acceleration lanes assumed to be 250 ft.(76 meters).
(1)Level of service calculated using generalized "rolling" terrain instead of exact specific grade/length.
(2) LOS D is the target level of service for freeway diverge analysis, thus LOS E is unacceptable for off-ramp operations. LOS E is the target level of service for freeway mainline and merge (on-ramp) analyses.

**Table 5.4-21** provides a similar summary of cumulative freeway merge/diverge operations, but is based on the use of the specific grade and grade length along the freeway. As previously described, it has been determined that the levels of service reported are the same for both alternatives. Again, the levels of service depicted are based on minimum acceleration/deceleration lengths of 250 ft.(76 meters).

As the table below shows, some levels of services are shown to be slightly improved when compared to levels of service calculated when using "rolling" terrain instead of actual specific grades and grade lengths. Specifically, the westbound off-ramp is found to operate acceptably at LOS D for all peak hour scenarios, whereas both on-ramps are projected to operate acceptably at LOS E or better. Therefore, these are considered as ***less-than-significant impacts***.

## Table 5.4-21 Cumulative Plus Project Freeway Ramp Level of Service (Specific Grade/Length)[(1)]

| Ramp | Specific Grade | Specific Length (ft) | Level of Service | | |
|---|---|---|---|---|---|
| | | | AM Peak Hour | PM Peak Hour | Saturday Peak Hour |
| Eastbound off-ramp | +4.38 | 2,525 | ------ | **F** | **F** |
| Eastbound on-ramp | +2.28 | 1,150 | ------ | E | D |
| Westbound off-ramp | -2.28 | 1,150 | D | ------ | D |
| Westbound on-ramp | -4.38 | 2,525 | D | ------ | D |

*Source*: David Evans and Associates.
*Notes*: Length of deceleration and acceleration lanes assumed to be 250 ft.(76 meters).
(1) Level of service calculated using exact specific grade/length instead of generalized "rolling" terrain.

Using minimum acceleration/deceleration lengths of 250 ft. (76 meters) along a 4-lane facility, the eastbound off-ramp would continue to operate unacceptably at LOS F for cumulative conditions during both the weekday PM peak hour and Saturday peak hour.

The possibility of obtaining improved LOS by extending the deceleration lane leading from the eastbound off-ramp was investigated. The ramp will continue to operate unacceptably regardless of the length of the deceleration lane due to the high volumes and weaving along the freeway which exceeds capacity. Therefore, this is considered to be a ***significant mitigable impact***.

The operation is considered to operate adequately with the development of an auxiliary land between Shingle Springs Drive and the interchange (eastbound direction).

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB.

Because of the methodology used to calculate the specific grade and grade length along the freeway, minor differences in the location of the ramp juncture points for each alternative do not change the length of the grade. Therefore, the specific grade and length of the ramps itself were negligible in terms of the level of service of the ramp merge/diverge, and the same specific grade and grade length along the freeway are applicable to analyses for both alternatives. To verify, a detailed analysis was performed for Alternative AB, and a trial and error input of the other possible input values for the Alternative AC was performed. This trial and error input included the ramp lengths, grades and volumes for Alternative AC, as well as extreme ramp lengths, grades and volumes outside the range of possibilities for Alternative AC. This trial and error analysis confirmed that the merge/diverge levels of service for the all alternatives and peak hour scenarios correspond to those calculated for Alternative AB. Therefore, for analyses which provide for the input of specific grades and grade lengths, the same values are used for both alternatives since the input for each result in exactly the same level of service results.

A free flow speed of 48 kph (30 mph) was used for both project alternatives. This default value was used to approximate the design speed of 80 kph (50 mph) at inlet and exit noses of the ramps associated with both alternatives, and 40 kph

(25 mph) along the remainder of the ramp associated specifically with Alternative AC.

As the applicable tables for Alternative AB show, the westbound off-ramp is found to operate acceptably at LOS D for all peak hour scenarios, whereas both on-ramps are projected to operate acceptably at LOS E or better. Therefore, these are considered as ***less-than-significant impacts***.

Using minimum acceleration/deceleration lengths of 250 ft. (76 meters) along a 4-lane facility, the eastbound off-ramp would operate unacceptably at LOS F for cumulative conditions during both the weekday PM peak hour and Saturday peak hour. The ramp will continue to operate unacceptably regardless of the length of the deceleration lane due to the high volumes and weaving along the freeway which exceeds capacity. Therefore, this is considered to be a ***significant mitigable impact***.

The operation is considered to operate adequately with the development of an auxiliary land between Shingle Springs Drive and the interchange (eastbound direction).

### *Mitigation 5.4-5 Cumulative Plus Project- Ramp Merge/Diverge Operations*

The impact identified above will be reduced to a ***less than significant*** level with the implementation of the following mitigation:

(A) Provide an eastbound auxiliary lane for AB and AC between the eastbound East Shingle Springs Drive on-ramp and the eastbound off-ramp to the Rancheria. The provision of this auxiliary lane would result in acceptable LOS D or better operation for the eastbound off-ramp during all three peak hour scenarios during the cumulative year.

### *Impact 5.4-6 Cumulative Plus Project- Peak Hour Freeway Mainline Operations*

AA There would be ***no impact*** associated with the No Project Alternative.

AB **Table 5.4-22** shows the freeway mainline operations along the existing 4-lane freeway for all three peak hour scenarios during the cumulative year 2025 following the completion of the proposed interchange and proposed hotel and casino.

## Table 5.4-22 Cumulative Plus Project (4-lanes) Peak Hour Freeway Mainline Level of Service

| Freeway Segment | Freeway Level of Service[(1)] | | | | | |
|---|---|---|---|---|---|---|
| | Cumulative (no project) | | | Cumulative plus Project | | |
| | AM Pk Hr | PM Pk Hr | Sat Pk Hr | AM Pk Hr | PM Pk Hr | Sat Pk Hr |
| Eastbound US-50 (between E. Shingle Springs & Rancheria) | D | E | E | D | **F** | E |
| Eastbound US-50 (between Rancheria & Greenstone) | D | E | E | D | E | E |
| Westbound US-50 (between Greenstone & Rancheria) | E | D | D | E | D | E |
| Westbound US-50 (between Rancheria & E. Shingle Springs) | E | D | D | E | D | E |

*Source*: David Evans and Associates.
*Notes:* (1) Free Flow speed varies - "Ideal" Free Flow Speed of 65 mph adjusted to account for specific hwy geometry.

As the above table shows, the freeway is projected to operate acceptably at LOS E or better for both east and west of the proposed interchange along both directions during AM and Saturday peak hour conditions. During the PM peak hour, the freeway is projected to operate acceptably at LOS E or better both east and west of the proposed interchange along the westbound direction, and east of the proposed interchange along the eastbound direction. Therefore, these are considered ***less-than-significant impacts***.

However, the freeway is projected to operate unacceptably at LOS F west of the proposed interchange along the eastbound direction during the PM peak hour. This is considered to be a ***significant mitigable impact***.

The operation is considered to operate adequately with the development of an auxiliary land between Shingle Springs Drive and the interchange (eastbound direction).

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB.

As the above table shows, the freeway is projected to operate acceptably at LOS E or better for both east and west of the proposed interchange along both directions during AM and Saturday peak hour conditions. During the PM

peak hour, the freeway is projected to operate acceptably at LOS E or better both east and west of the proposed interchange along the westbound direction, and east of the proposed interchange along the eastbound direction. Therefore, these are considered ***less-than-significant impacts***.

However, the freeway is projected to operate unacceptably at LOS F west of the proposed interchange along the eastbound direction during the PM peak hour. This is considered to be a ***significant mitigable impact***.

The operation is considered to operate adequately with the development of an auxiliary land between Shingle Springs Drive and the interchange (eastbound direction).

### *Mitigation* *5.4-6 Cumulative Plus Project- Peak Hour Freeway Mainline Operations*

The impact identified above will be reduced to a ***less than significant*** level with the implementation of the following mitigation:

(A) Provide an eastbound auxiliary lane for AB and AC between the eastbound East Shingle Springs Drive on-ramp and the eastbound off-ramp to the Rancheria. The provision of this auxiliary lane would result in acceptable LOS D or better operation along the 3-lane weaving section (which includes an eastbound auxiliary lane between the eastbound East Shingle Springs Drive on-ramp and the eastbound off-ramp to the Rancheria) during all three peak hour scenarios during the cumulative year.

### *Impact* *5.4-7 Cumulative Plus Project- Interchange Intersection Operations*

AA There would be ***no impact*** associated with the no project alternative.

AB Since there are no intersections associated with the Flyover Alternative, there would be ***no impact*** associated with the Flyover Alternative.

AC Interchange operations are analyzed only for Alternative AC, since the modified trumpet design of Alternative AB contains no intersections to analyze. If constructed as a diamond interchange as proposed for Alternative AC, the interchange would include two intersections.

### *Unsignalized Intersection Analysis*

**Table 5.4-23** provides a summary of cumulative plus project intersection operations following the completion of the interchange and hotel and casino for unsignalized intersections.

**Table 5.4-23 Cumulative Plus Project Unsignalized Level of Service**

| Intersection | AM Peak Hour | | PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|
| | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) |
| New Shingle Springs Rancheria Road / Westbound ramps | A | (1.3) | A | (1.0) | A | (1.2) |
| New Shingle Springs Rancheria Road / Eastbound ramps | B | (5.5) | C | (12.0) | **F** | **(55.1)** |

*Source:* David Evans and Associates.
*Notes:* Applicable only for Alternative AC since Alternative AB includes no intersections. Delay for unsignalized intersections based on overall average vehicle delay.

As the above table shows, the eastbound ramp intersection would not operate at an acceptable level of service as an unsignalized intersection. This is considered to be a ***significant mitigable impact***.

### *Signalized Intersection Analysis*

Both of the intersections would meet Caltrans signal warrants for rural conditions, although the westbound ramps are warranted only for weekday PM peak hour and Saturday peak hour conditions, and the eastbound ramps are warranted only for Saturday peak hour conditions. It is thus recommended that at a minimum the eastbound ramp intersection be signalized as part of the interchange construction. Although not necessary to provide acceptable level of service operation, it is also recommended that the westbound ramp intersection also be signalized to provide efficient operation.

**Table 5.4-24** below shows the level of service for the two intersections following signalization for cumulative conditions.

## Table 5.4-24 Cumulative plus Project Signalized Level of Service

| Intersection | AM Peak Hour | | PM Peak Hour | | Saturday Peak Hour | |
|---|---|---|---|---|---|---|
| | LOS | Delay (sec) | LOS | Delay (sec) | LOS | Delay (sec) |
| New Shingle Springs Rancheria Road / Westbound ramps | A | (3.4) | A | (3.6) | B | (7.0) |
| New Shingle Springs Rancheria Road / Eastbound ramps | B | (8.3) | B | (6.8) | B | (8.4) |

*Source:* David Evans and Associates.
*Notes:* Applicable only for Alternative AC since Alternative AB includes no intersections.

### *Interchange Queuing Analysis*

Using the SYNCHRO software analysis described previously, the queuing along each of the intersection approaches were analyzed. **Table 5.4-25** summarizes the queuing which would occur along each of the intersection approaches for cumulative conditions following the completion of the interchange project for signalized intersections.

## Table 5.4-25 Cumulative Plus Project Intersection Queuing for Signalized Intersections

| Movement | Available Queue Capacity (ft) | AM Peak Hour Queue (ft) | | PM Peak Hour Queue (ft) | | Saturday Peak Hour Queue (ft) | |
|---|---|---|---|---|---|---|---|
| | | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile | 50th Percentile | 95th Percentile |
| **New Project Access / Westbound US-50 Ramps** | | | | | | | |
| Northbound | 163 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southbound Thru | 760+ | 8 | 28 | 25 | 65 | 46 | 91 |
| Southbound Right | 760+ | 21 | 59 | 53 | 133 | 134 | 340 |
| Westbound | 1,275 | 56 | 93 | 54 | 94 | 70 | 131 |
| **New Project Access / Eastbound US-50 Ramps** | | | | | | | |
| Southbound | 163 | 18 | 46 | 50 | 117 | 87 | **174 [11]** |
| Eastbound | 983 | 92 | 140 | 125 | 172 | 134 | 216 |

*Source:* David Evans and Associates.

As the above shows, the queuing capacity for each of the approaches is expected to easily accommodate the projected queues for each of the cumulative peak hour scenarios for Alternative AC, with the exception of the southbound approach to the eastbound ramp intersection during Saturday peak

hour conditions. Although the queue capacity is adequate for more than 50% of the Saturday peak hours (as shown by the 50th percentile queue), it would exceed the link capacity between the westbound and eastbound ramps during at least 5% of the Saturday peak hours (as shown by the 95th percentile queue). Even then, the excess queue would amount only to a single vehicle.

This excess queue would in effect stretch through the westbound ramp intersection to the section of the new roadway north of the interchange. If signalized and coordinated with the signal for the eastbound ramps, the signal timing coordination could ensure that the eastbound ramp intersection would provide additional or offset green time to clear the westbound intersection. Additionally, even in a worse case scenario where traffic did extend through the westbound ramp intersection, these vehicles would not block any of the predominate movements through the intersection, since the other movements are associated primarily with southbound rights and westbound off-ramp right turns to the Rancheria. The only movements which would potentially be blocked would be associated with vehicles which intended to use the interchange to reverse their direction of travel along US-50. If the interchange were congested, it is doubtful anyone would negotiate this movement at this particular interchange.

### *Mitigation 5.4-7 Cumulative Plus Project- Interchange Intersection Operations*

The impact identified above will be reduced to a ***less than significant*** level with the implementation of the following mitigation:

A) It is recommended that the two newly created intersections under AC be signalized, and that the signals be coordinated to assure that queues would not develop which would block the westbound ramp intersection.

### *Impact 5.4-8 Cumulative Plus Project- Ramp Metering*

AA There would be ***no impact*** associated with the No Project alternative.

AB **Table 5.4-26** provides a summary of the ramp metering conditions along the new on-ramps for Saturday peak hour conditions. Saturday peak hour conditions are when traffic volumes along the new on-ramps would be heaviest. This is considered to be a ***significant mitigable impact***. The table

shows that the ramp metering at the proposed on-ramps would operate without the queue exceeding the storage length if metering rates were as provided.

**Table 5.4-26 Ramp Metering**

| On-Ramp | Storage Length | Storage Vehicles | Peak Hour Volumes | Metering Rate (vph) |
|---|---|---|---|---|
| Westbound on-ramp | 472 ft (144 meters) | 16 | 615 | 600 |
| Eastbound on-ramp | 640 ft (195 meters) | 22 | 305 | 285 |

*Source:* David Evans and Associates.

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB. This is considered to be a ***significant mitigable impact***.

### *Mitigation 5.4-8 Cumulative Plus Project- Ramp Metering*

The impact identified above will be reduced to a ***less than significant*** level with the implementation of the following mitigation:

(A) Implement the recommended metering rates along the newly created on-ramps.

### *Impact 5.4-9 Cumulative Plus Project- Local Roads Analysis*

AA There would be ***no impact*** associated with the no project alternative

AB **Table 5.4-27** provides a summary of all of the local roadway and highway segments within El Dorado County along which the project is projected to increase existing traffic volumes by 2% or more. The table also shows the resulting level of service along the roadway using capacities as established within spreadsheets associated with the El Dorado County model.

Roadway geometries, and corresponding capacities, for cumulative conditions are based on the roadway network geometries included within the 2022 CIP (Capitol Improvement Program) data network files contained with the 1999 El Dorado County travel demand model.

**Table 5.4-28** provides a summary of the portion of US-50 within El Dorado County along which the project is projected to increase existing traffic volumes by 2% or more (with the exception of US-50 between East Shingle

## Table 5.4-27 Cumulative Local Roadway Impact Summary (Cumulative + Project Volumes 2% over Cumulative No Project)

| Road /Segment | Geometry/Classification | Cumulative | | Project | | Cumulative + Project | |
|---|---|---|---|---|---|---|---|
| | | Daily Vol | LOS | Daily Vol | % Inc | Daily Vol | LOS |
| **Big Cut Rd.** | | | | | | | |
| Benham St to Quarry Rd | 2-Lane Rural Local Rd | 1,388 | B | 28 | 2.0% | 1,416 | B |
| **Buckeye Rd.** | | | | | | | |
| E. Shingle Springs to | 2-Lane Rural Local Rd | 469 | B | 59 | 12.6% | 528 | B |
| Mother Lode Rd (W) | | | | | | | |
| **Greenstone Rd.** | | | | | | | |
| Mother Lode to US 50 | 2-Lane Rural Minor Collector | 922 | B | 322 | 34.9% | 1,244 | B |
| US 50 to Green Vly Rd | 2-Lane Rural Minor Collector | 3,784 | B | 268 | 7.1% | 4,052 | B |
| **Green Valley Rd.** | | | | | | | |
| Lotus Rd to Greenstone | 4-Lane Divided Urban Minor | 4,308 | A | 238 | 5.5% | 4,546 | A |
| | Arterial (Upgraded) | | | | | | |
| **Larsen Rd.** | | | | | | | |
| Barkley Rd to North Canyon Rd | 2-Lane Rural Local Rd | 618 | B | 21 | 3.4% | 639 | B |
| **Lotus Rd.** | | | | | | | |
| Green Vly Rd to GoldHill Rd | 2-Lane Rural Minor Arterial | 9,077 | D | 224 | 2.5% | 9,301 | D |
| GoldHill Rd to Thompson Hill | 2-Lane Rural Minor Arterial | 6,360 | C | 207 | 3.3% | 6,567 | C |
| Thompson Hill to Bassi Rd | 2-Lane Rural Minor Arterial | 6,360 | E | 207 | 3.3% | 6,567 | E |
| Bassi Rd to SR 49 | 2-Lane Rural Minor Arterial | 6,360 | E | 207 | 3.3% | 6,567 | E |
| **Missouri Flat Rd.** | | | | | | | |
| MO Flat Conn to Pleasant Valley Rd | 2-Lane Rural Minor Arterial | 8,236 | D | 184 | 2.2% | 8,420 | D |
| **Mother Lode Dr.** | | | | | | | |
| Greenstone to Pleasant Vly Rd | 2-Lane Rural Major Collector | 11,372 | E | 279 | 2.5% | 11,651 | E |
| **Pleasant Valley Rd.** | | | | | | | |
| Mother Lode Dr to El Dorado Rd | 2-Lane Rural Minor Arterial | 9,166 | E | 250 | 2.7% | 9,416 | E |
| El Dorado Rd to SR 49 | 2-Lane Rural Minor Arterial | 11,000 | E | 243 | 2.2% | 11,243 | E |
| **SR 49** | | | | | | | |
| Mo Flat Rd to Pleasant Vly (DS) | 2-Lane Rural Highway | 5,792 | D | 132 | 2.3% | 5,924 | D |
| US 50 to SR 193 (N) | 2-Lane Rural Highway | 6,200 | E | 152 | 2.5% | 6,352 | E |
| SR 193 (N) to Gold Hill | 2-Lane Rural Highway | 4,487 | E | 108 | 2.4% | 4,595 | E |
| Gold Hill Rd to Cold Springs | 2-Lane Rural Highway | 2,362 | C | 101 | 4.3% | 2,463 | C |
| Cold Springs to Lotus Rd | 2-Lane Rural Highway | 3,545 | D | 112 | 3.2% | 3,657 | D |
| Lotus Rd to Marshall Rd. | 2-Lane Rural Highway | 6,026 | C | 235 | 3.9% | 6,261 | C |
| Marshall to Salmon Falls Rd | 2-Lane Rural Highway | 4,509 | B | 203 | 4.5% | 4,712 | B |
| Salmon Falls Rd to SR 193 | 2-Lane Rural Highway | 6,589 | C | 198 | 3.0% | 6,787 | C |

*Source:* David Evans and Associates.

Springs Drive and Greenstone Road, which is analyzed elsewhere for peak hour conditions). Traffic volumes east of Greenstone Road are not projected to increase by 2% or more. The table also shows the resulting level of service along the roadway using capacities as established within spreadsheets associated with the El Dorado County model.

Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact any of the local roadways and highways (including SR-49 and SR-193, but excluding US-50) for cumulative conditions on an average weekday. Therefore, this is considered a ***less-than-significant impact***.

Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact US-50 within El Dorado County east of El Dorado Hills Boulevard. Therefore, this is considered a ***less-than-significant impact***.

**Table 5.4-28 Cumulative Local Roadway (US-50) Impact Summary (Cumulative + Project Volumes 2% over Cumulative No Project)**

| | | Cumulative | | Project | | Cumulative + Project | | |
|---|---|---|---|---|---|---|---|---|
| **Segment** | **Geometry/ Classification** | **Daily Vol[1]** | **LOS** | **Daily Vol** | **% Increase** | **Daily Vol** | **LOS** | **Target LOS E or Better? [2]** |
| County Line to EDHB/Latrobe | 6-Lane Freeway | **135,000** | **F*** | 4,235 | 3.1% | **139,235** | **F*** | **NO** |
| EDHB/Latrobe to Bass Lake Rd | 6-Lane Freeway | 111,347 | D | 4,377 | 3.9% | 115,724 | E | Yes |
| Bass Lake Rd to Cambridge Rd | 6-Lane Freeway | 98,896 | D | 4,397 | 4.4% | 103,293 | D | Yes |
| Cambridge Rd to Cameron Pk Dr | 6-Lane Freeway | 86,247 | C | 4,439 | 5.1% | 90,686 | C | Yes |
| Cameron Pk Dr to Shingle Springs | 6-Lane Freeway | 72,045 | C | 4,607 | 6.4% | 76,652 | C | Yes |
| Shingle Springs to E. Shingle Spr | 4-Lane Freeway | 63,285 | D | 4,807 | 7.6% | 68,092 | D | Yes |
| E. Shingle Spr to New Interchange | 4-Lane Freeway | 61,690 | C | 4,856 | 7.9% | 66,546 | D | Yes |

*Source:* David Evans and Associates.
*Notes: (1)* Cumulative daily volumes are 2022 year volumes as reported within the 1999 version of the "*El Dorado County Travel Demand Forecasting Model,"* with exception of County Line to EDHB/Latrobe which was supplied by Caltrans.
(2) Concept level of service for US-50 is LOS E based on *Caltrans' State Route 50 Transportation Concept Repo*rt.
* Deficient Operation

However, as noted, it is anticipated that the section of US-50 between the El Dorado County Line and El Dorado Hills Boulevard will operate at a deficient LOS F operation without the project. The addition of project traffic will add

to the projected adverse operation within this section of US-50. This is considered to be a ***significant mitigable impact***.

To address this incremental cumulative impact, it is recommended that the project participate in a fair share contribution for future master planned improvements as identified by Caltrans and El Dorado County for this section of freeway.

AC Impacts associated with Alternative AC are identical to those identified above for Alternative AB.

Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact any of the local roadways and highways (including SR-49 and SR-193, but excluding US-50) for cumulative conditions on an average weekday. Therefore, this is considered a ***less-than-significant impact***.

Based on the methodology and impact analysis criteria established above, the Proposed Project was found to not significantly impact US-50 within El Dorado County east of El Dorado Hills Boulevard. Therefore, this is considered a ***less-than-significant impact***.

However, as noted, it is anticipated that the section of US-50 between the El Dorado County Line and El Dorado Hills Boulevard will operate at a deficient LOS F operation without the project. The addition of project traffic will add to the projected adverse operation within this section of US-50. This is considered to be a ***significant mitigable impact***.

To address this incremental cumulative impact, it is recommended that the project participate in a fair share contribution for future master planned improvements as identified by Caltrans and El Dorado County for this section of freeway.

### *Mitigation 5.4-9 Cumulative Plus Project- Local Roads Analysis*

The following mitigation measure will reduce the cumulative impact to a ***less-than-significant*** level.

(A) Pursuant to Section 10.8 of Tribal State Compact, the tribal government will contribute a fair share contribution to future master

planned improvements as identified by Caltrans and El Dorado County for the section of US-50 between the El Dorado County Line and El Dorado Hills Boulevard.